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DIVISION OF FOREST PEST CONTROL

Northeastern Area State & Private Forestry

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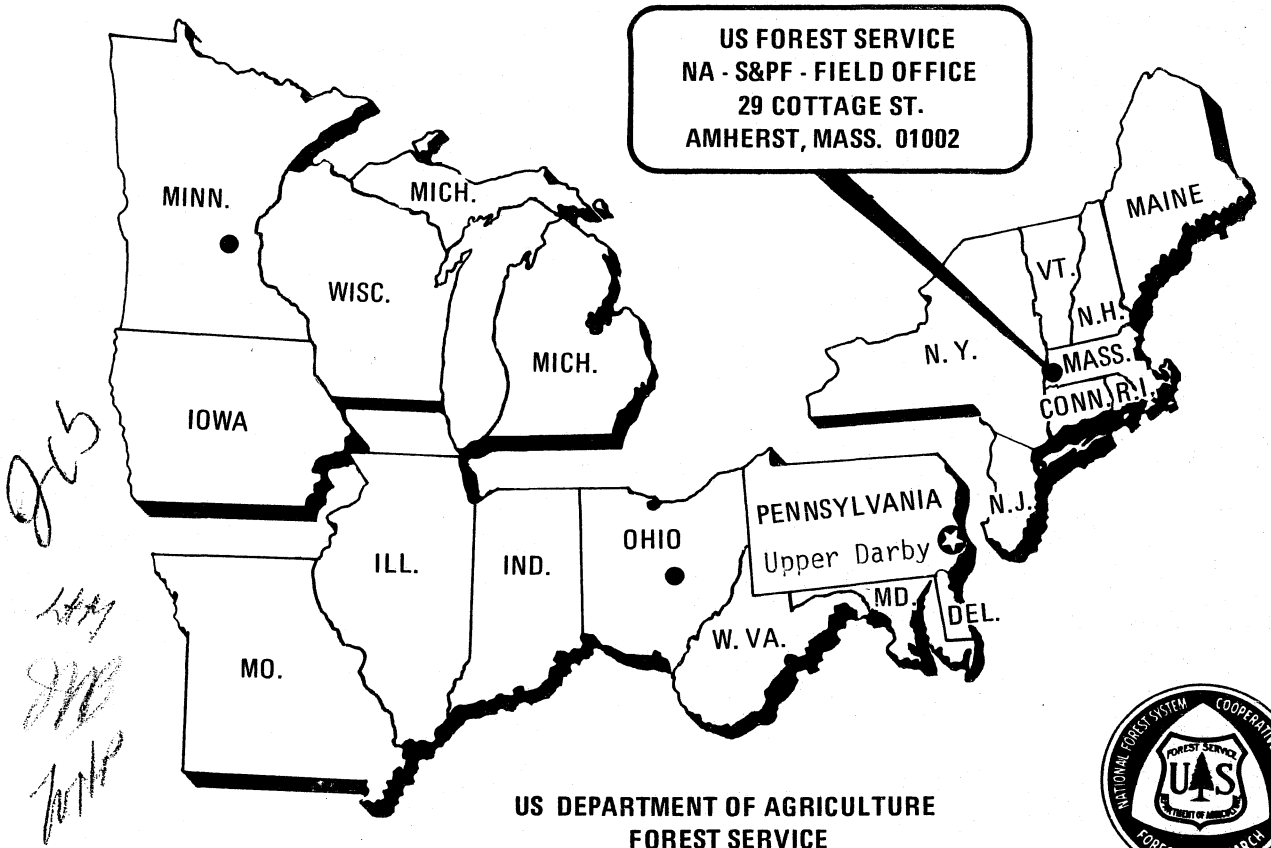
DETECTION AND EVALUATION OF MAPLE BARK SCALE-NECTRIA ON THE WHITE MOUNTAIN NATIONAL FOREST

James S. Hadfield

November 1968



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ABSTRACT

Maple bark scale-Nectria was detected on two of the 74 areas examined on the White Mountain National Forest. Only five infected trees were observed.

INTRODUCTION

On August 30, 1968, maple bark scale and Nectria fruit bodies were found for the first time in the northern hardwood forests of New England. The organisms were found on four sugar maples in the Kilkenny unit of the Androscoggin Ranger District, White Mountain National Forest (1).

Maple bark scale was known to be present on the WMNF, but Nectria had never been found on any of the infested trees.

The maple bark scale-Nectria association and damage closely resembles the beech bark disease syndrome which has essentially eliminated sawtimber beech on the WMNF. The scale insects, both in the Cryptococcus genus, are very similar. The Nectria perithecia observed on maple appears identical to those taken from a beech.

A survey to determine the extent and distribution of the maple bark scale-Nectria association was considered essential because of the tremendous value of sugar maple on the WMNF.

SURVEY METHODS

The survey was conducted by selecting 74 points at random on a map. This system works well because sugar maple can be found almost everywhere on the Forest. At each of these 74 points sugar maples between 2-8" dbh were examined for maple scale. The search was restricted to an area on the bole from two to six feet above the ground.

The degree of infestation was classified as trace, light, medium and heavy as in the Walker Maple Scale Slides (2). The criteria for these classifications are as follows:

Trace - Difficult to find scales. Insects are not clustered. Infestation cannot be seen from 4-5 feet.

Light - Some clustering of scales, bark crevices only partially filled. Infestation cannot be seen at 8-10 feet. One percent or less of the bark surface covered.

Medium - Bark crevices filled. Scales not on ridges between cracks. Less than 10% of the bark surface covered.

Heavy - Bark crevices filled, with some scales on the ridges between cracks. Ten percent or more of the surface covered.

When an infected tree was located it was critically examined for signs of Nectria. Five (5) infested or a total of 50 infested and uninfested trees were examined at each point.

The survey was conducted by James Hadfield, Pathologist, and Vaughan McCowan, Entomologist.

RESULTS OF SURVEY

Maple bark scale-Nectria was detected at two of the 74 points (see map). One of the points (Plot 8) was the site of the August 30, 1968, scale-Nectria discovery. The two areas were 3-4 miles apart. Only one infected tree was found on the second area (Plot 7). A total of five infected trees were found on the Forest.

Maple bark scale was found on all Districts at 24 of the 74 points (see plot data and maps). The infestations were more abundant on the western half of the Forest.

Medium and heavy infestations were never located. Most infestations were classed as trace, with less than one scale per square inch of bark surface.

TECHNICAL INFORMATION

Causal Agents

Maple Bark Scale - Cryptococcus williamsi
Nectria sp.

Host Tree Attacked

Sugar maple - Acer saccharum

Type of Damage

The damage on trees with maple bark scale-Nectria was cankering. Bark was retained on the necrotic area. Necrotic areas varied from 2-12 square inches in size. None of the trees with the insect-fungus association had been girdled.

The four infected trees observed on August 30, 1968, were all within 50 feet of each other. Surrounding trees were not infected.

Parasites and Predators

Four types of predators were observed on maple bark scale infested trees. These were fireflies (Lampyridae), lacewing fly larvae (Chrysopidae), Syrphid fly larvae (Syrphidae), and twice-stabbed lady beetles (Chilocorus stigma). Twice-stabbed lady beetles are commonly seen feeding on beech scales. No attempt was made to measure the effectiveness of these predators in reducing maple scale populations.

Environmental Factors

Infestations of maple bark scale are heaviest in stands where sugar maple constitutes more than 75% of the type. Maple bark scale-Nectria was discovered in two stands of more than 50% maple.

Smooth bark healthy trees, regardless of crown class, are infested more than rough bark poor vigor trees.

Scale populations are heaviest on the north side of infested trees.

It was difficult to find the insects on maples when the bark began to crack and form plates. Scales could occasionally be found by prying off the bark plates but they were much more plentiful on small trees. Maple scale differs from beech scale in this respect. Beech scale infests all size trees from seedlings to the largest stems.

Color of the bark had no apparent effect on the degree of infestation, unlike beech scale.

Scale infestations could often be found on maples with annual cankers, presumably caused by Fusarium solani. Surrounding uncankered trees often had no scale insects. Nectria was found only on trees which had cankers caused by other agents, such as Fusarium solani.

DISCUSSION

Maple bark scale-Nectria was found on two of the 74 points checked (see map). Approximately 3000 sugar maples were closely examined during the survey, only five had scale and Nectria.

As was previously mentioned, four of the five infected trees were found on August 30, at the original location. All four of these trees had cankers caused by the fungus Fusarium solani. This causes a dark bleeding canker. This later develops into an open-faced canker that ceases development after one year except when opened by frost.

At the other area (Plot 7) only one maple with scale-Nectria was found. It had a long canker (4-5') caused by another tree falling against it. Maple scale-Nectria was found within the callus boundaries. Thus all trees which had maple scale-Nectria also had cankers caused by other agents.

It is not possible to state that the Nectria observed on the five trees was or was not directly associated with the maple bark scale infestations. A distinct possibility is that Nectria became established on the tissues killed or wounded by some other agent such as

Fusarium solani or a falling tree. It is not uncommon to find Nectria fruit bodies on dead maples.

The possibility of Nectria infecting maple bark scale feeding wounds should not be ruled out. The feeding of maple bark scale in all likelihood creates the same type of wound as beech scale. Whether Nectria can invade these wounds is not known.

It seems that an increase in bark thickness is the major limitation to maple scale infestations. Unfortunately, maple scale infests the healthiest, best growing maple more than poor growing stock. It also is more abundant in pure maple stands.

RECOMMENDATIONS

Forest Pest Control should establish one observation plot on each Ranger District. These plots will serve three purposes.

1. They will provide a means of observing population trends of maple bark scale.

2. The plots will be used to determine if infections by pathogenic organisms are associated with scale infestations.

3. The plots will serve as a demonstration for Forest personnel who wish to familiarize themselves with the insect.

LITERATURE CITED

1. Hadfield, J. S. 1968. Detection Report. Maple bark scale-Nectria on the White Mountain National Forest. USDA-Forest Service, Amherst Field Office, A-68-14.

2. Walker, E. B. A series of color slides which show degree of infestation. These slides have been accepted as the standards in the Northeast.

PLOT DATA

Plot No.	Degree Infestation	Plot No.	Degree Infestation
1	0*	26	0
2	0	27	0
3	0	28	0
4	T(2)**	29	0
5	T(5)	30	0
6	0	31	0
7	T(2) L(3) N(1)***	32	T(1)
8	T(5) N(4)	33	T(5)
9	0	34	0
10	0	35	0
11	0	36	0
12	0	37	0
13	0	38	T(5)
14	0	39	0
15	L(2)	40	T(2)
16	0	41	0
17	T(1)	42	0
18	0	43	T(5)
19	0	44	0
20	0	45	0
21	0	46	T(5)
22	0	47	T(5)
23	0	48	0
24	0	49	0
25	T(3)	50	T(4) L(1)

Plot No.	Degree Infestation	Plot No.	Degree Infestation
51	T(1) L(1)	63	T(1)
52	0	64	0
53	T(5)	65	0
54	T(1)	66	T(3)
55	0	67	0
56	T(1)	68	T(2)
57	0	69	0
58	0	70	0
59	0	71	L(1)
60	0	72	0
61	0	73	0
62	0	74	T(5)

Nectria found at Plots 7 and 8. Scale was found on 24/74 plots.

* Letters refer to degree of infestation

0 - None T - Trace L - Light N --Scale-Nectria

** The number in parenthesis indicates the number of trees in each category. 0 indicates fifty trees were examined.

*** Nectria was found on a tree with a light infestation.

Maple Bark Scale-Nectria Survey Map

White Mountain National Forest

Legend	Degree of infestation
	No maple scale infestations
	Trace infestations
	Light infestations
	Maple scale-Nectria

on map of state map

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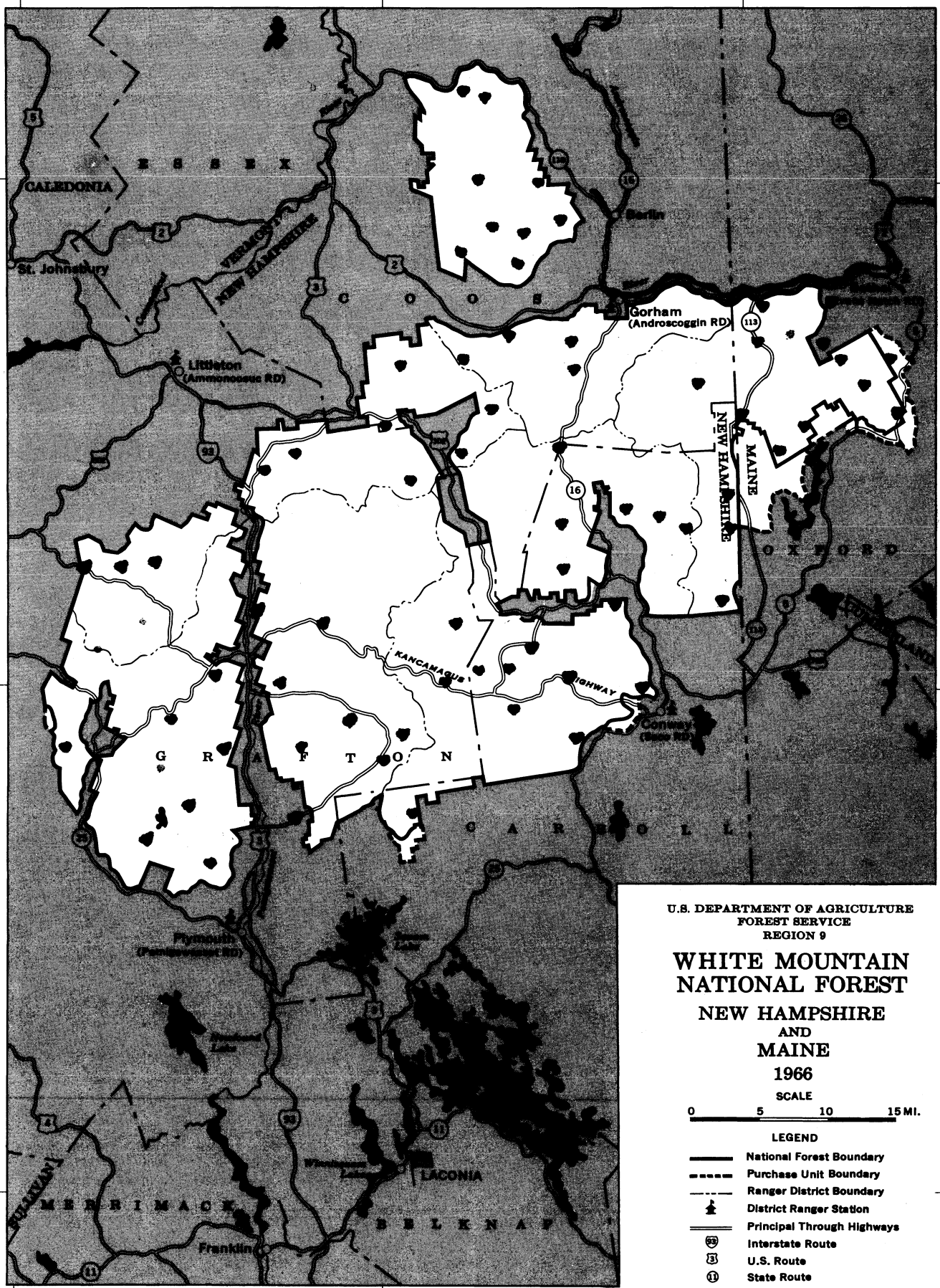
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